

Kelleria bogongensis Snow Daphne

Taxonomy

Kelleria bogongensis Marks

The taxon was formerly included in the (now) New Zealand endemic taxon *Kelleria laxa* (Cheeseman) Heads, from which it differs in the smaller, 1-3-nerved leaves and fewer-flowered inflorescences.

Current conservation status

Listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* as *Kelleria laxa* (SAC 1991).

Categorised as Endangered in the 2014 Advisory list of rare or threatened flora (DEPI 2014).

Proposed conservation status

Critically Endangered in Australia

Criterion B1ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a creeping, mat-forming shrublet, rooting at nodes, to 3 cm high, 40 cm diam. Stems c. 1 mm diam., shortly pubescent around leaf-bases, otherwise glabrous. Leaves oblong to very narrowly elliptic, flat or slightly incurved, apex obtuse with a tuft of cilia, glaucous, upper surface glabrous, margins and distal end of lower surface ciliate; lamina (0.5-)2-3(-4) mm long, 0.4-0.6 mm wide, main vein and usually two lesser veins visible underneath. Inflorescence of 1-3 flowers, with 1 or 2 central vegetative buds that grow out after anthesis; bracts narrowly oblong, often larger than leaves. Flowers bisexual, perianth c. 2.5 mm long, including lobes c. 1 mm long, the whole appressed ciliate on outer surface, usually with a few hairs within the tube floral tube 1.5-2 mm long, corolla lobes c. 1 mm long; stamens alternating with tepals, filaments 0.1-0.6 mm long; style 0.6-0.9 mm long. Seed ovoid, c. 2 mm long, black, glossy. Flowers late November to February, producing fruit from December through to March (VicFlora 2015).

The taxon was found to most closely resemble *K. multiflora* in leaf size, shape, texture and stem pubescence. However, it was found to exhibit gynodioecy (a breeding system in which male-sterile individuals (i.e. females) coexist with hermaphroditic individuals in populations), where *K. multiflora* exhibits hermaphroditism. While both *K. bogongensis* and *K. multiflora* 'are less tied to wet conditions' than other members of the genus, *K. bogongensis* are commonly in damp sites and can be found in waterlogged bogs. Further, in cases where *K. bogongensis* shares subalpine grassland with *K. dieffenbachii*, it was shown to favour damper, south-facing slopes.

Generation Length

The generation length of *Kelleria bogongensis* is inferred to be 30 to 100 years. The upper and lower bounds are based on the spreading of mat-forming habit, and the taxon's ability to sucker from the roots system. This suggests an extended longevity and, potentially, a very slow rate of generational turn over.

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Distribution

The taxon is endemic to Victoria, where it is known from a single location on the Bogong High Plains in the Victorian Alps. Specifically, it may be found near Mt Jim, at about 1,800 metres above sea level, in the Australian Alps IBRA Bioregion. Based on current knowledge, the population consists of 18 patches.

In 2006, the abundance was estimated at between 400 to 2,000 plants, and in 2009, an Action Statement by the Victorian Government suggested approximately 1,700 individuals existed at the time, in 19 patches within a single population. In 2014, Marks and Walsh counted 18 patches that ranged in size from 0.1 m² to 5 m², within an area of 1.5 x 0.5 km. There is therefore some evidence to suggest decline, although the extent of the decline is difficult to determine. The extent of range and abundance of *K. bogongensis* prior to European settlement is unknown.

Habitat

The taxon is found on basalt-derived soil, growing between snow-grass tussocks in alpine grassland (VicFlora 2015), dominated by *Poa costiniana* on shallow organic loams overlaying basalt (Tertiary Older Volcanics). Plants form discontinuous mats on the edges of seasonally inundated pools, or between *Poa* tussocks, and are nearly always in association with Shining Cudweed (*Argyrotegium nitidulum*) and *Lobelia surrepens*. Other associated taxa include *Rytidosperma nudiflorum*, *Alpine Stackhousia*, and *Luzula alpestris*.

Threats

Threats to the taxon include grazing and trampling pressure from feral horses, trampling and ecological modification by cattle, public access causing trampling, impacts of climate change including decreasing soil moisture, drier conditions, decreased rainfall, increased average temperature, and increased risk of fire, and fire frequency and intensity.

IUCN Criteria

Criterion A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]</p> <p>A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>based on any of the following:</p> <p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>			

Evidence:

Ineligible under Criterion A

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy)			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

Evidence:

Eligible under Criterion B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 12 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the Area of Occupancy (AoO) to ensure consistency with the definition of AoO as an area within EoO.

The taxon is estimated to be severely fragmented, as each subpopulation may comprise of as few as one genetic individual of unknown age with no evidence that any result from recent recruitment events, which suggests that seed recruitment may be a rare event. There are no known mechanisms for seed dispersal even over short distances therefore the probability of recolonisation, in the event of local extinction, is remote.

The taxon is considered to occur in one location as all patches within this exceptionally small AoO are subject to the identified threats, which can rapidly affect all individuals of the taxon present.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the effects of the identified threats.

Eligible under Criterion B2 as Endangered

The AoO across the taxon's range is estimated to be 12 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it severely fragmented, has one location, and has a continuing decline in (i), (ii), (iii), (iv) and (v).

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Criterion C. Small Population size and decline		Critically Endangered	Endangered	Vulnerable
Number of mature individuals		< 250	< 2,500	< 10,000
AND at least one of C1 or C2				
C1	An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2	An observed, estimated, projected or inferred continuing decline AND least 1 of the following 3 conditions:			
(a)	(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
	(ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b)	Extreme fluctuations in the number of mature individuals			

Evidence:

Ineligible under Criterion C

It is inferred that there are 18 to 2,000 mature individuals, but other thresholds under this criterion have not been met.

Criterion D. Very small or restricted populations		Critically Endangered	Endangered	Vulnerable
Number of mature individuals (observed or estimated)		< 50	< 250	< 1,000
D2. Only applies to the VU category Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time.		-	-	D2. Typically: AoO < 20 km ² or number of locations ≤ 5

Evidence:

Eligible under criterion D2 as Vulnerable

The taxon is estimated to be very restricted.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

References

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